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Improving nutritional status at national and community levels: lessons from South Asia

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Improving the nutritional status at individual, household and national levels is one of the widely agreed objectives of many international conferences and summits held in the last decade. The Food and Agriculture Organization's (FAO's) latest estimates of the number of undernourished people confirm an alarming trend in the context of efforts to bring about reduction in hunger in the developing world. In 2001 - 2003 there were still 854 million undernourished people worldwide, of whom 820 million were in the developing countries, 25 million in the transition countries, and 9 million in the industrialized countries. The rate of reduction of undernutrition has slowed to a crawl and in most regions the number of undernourished is actually growing¹. With soaring food prices, the adverse effects on food security and nutrition are likely to be profound.

Asia is the world's largest and most populous continent with a population of almost 4 billion people, representing more than 60% of the world's total population. It also has a population density (89 persons/sq. km) which is the highest in the world, more than 4 times that of North or South America and 3 times that of Africa. Among the Asia-Pacific regions, South Asia is the most populous, with a population density (461 persons/sq. km) which is about 4 times higher than that of South-East Asia and twice that of East Asia². In relation to child malnutrition, South Asia's rank is somewhere near the middle in worldwide terms, and nutritional improvement has not correlated with the economic progress that has occurred in the last two

decades. Though growth has acted as a powerful driving force for poverty reduction in South Asia, the same is not true for improvement in nutritional status. This paper provides:

- an overview of the magnitude and nature of food security and the nutrition situation in South Asia;
- the pattern of food consumption and availability;
- development indicators;
- information systems for nutrition improvement programmes at national and community levels; and
- policy considerations.

Magnitude and nature of food security and nutrition

Virtually, no progress has been made towards the World Food Summit (WFS) target of halving the number of undernourished people by the year 2015. Since 1990-92, (the baseline period for the WFS target), the undernourished population in the developing countries has declined only by 3 million (from 823 million to 820 million). This means that the average annual decrease since the Summit has been far below the level required for reaching the WFS goal of halving the number of undernourished people by the year 2015. It also means that the rate of reduction would have to be accelerated to 24 million per year, almost 10 times the current pace, in order to reach that goal. Progress over this period was slower than over the previous two decades when prevalence of undernutrition declined by 9% (37% to

28%) between 1969-71 and 1978-81 and by a further 8% (to 20%) between 1978-81 and 1990-92. In Asia (where China and India are treated as separate sub-regions in view of their large populations) significant progress in reducing the number of undernourished people was made in China and in the most populous sub-region, Southeast Asia. In India, though the prevalence of hunger declined, the outcome in terms of reduction in the numbers of undernourished has been small, as reduction in the first part of the decade (1990-92 to 1995-97) was subsequently reversed. During the same time period, the number of undernourished people increased in the rest of East Asia excluding China, and particularly in the rest of South Asia excluding India³.

Undernourishment and poverty

Measures of food deprivation, nutrition and poverty are strongly correlated. While poverty is an important cause of hunger, hunger can also be a cause of poverty. Hunger deprives impoverished people of the strength and skills to work productively. Studies have confirmed that hunger seriously impairs the ability of the poor to develop their skills and reduces the productivity of their labour. Studies in children have also shown that intermittent experiences of

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food insecurity and hunger are associated with impaired school performance, tiredness, absenteeism and higher levels of hyperactivity in children⁴. Micronutrient deficiencies can also reduce work capacity. Children with anaemia are not able to concentrate and have less energy for play and exploratory activity. In adults, anaemia diminishes work capacity and productivity by as much as 10-15%. In pregnant women, anaemia substantially increases the risk of death in childbirth, accounting for up to 20% of maternal deaths in Asia and Africa⁵.

Pattern of food consumption and availability

Given the multi-faceted nature of food security and nutrition, it must be agreed there can be no single indicator for measuring it, but that a variety of indicators are needed to capture the various dimensions of food insecurity. Food consumption per se and food consumption patterns are also determined by whether people have economic access to food. By and large, in poor countries, not only quantity of food consumed but the quality too is inadequate. Diets are not balanced, with a predominance of relatively low-cost cereals and few high-value food items, particularly foods of animal origin, vegetables and fruits. Malnutrition is, therefore, a common feature in these countries, especially among women and growing children whose food and nutrient needs are relatively higher than those of the other population groups⁶.

Food consumption patterns in South Asia

South Asia comprises seven countries: Bangladesh, Bhutan, India, Nepal, the Maldives, Pakistan and Sri Lanka. South Asia is the poorest region of the world next to sub-Saharan Africa in terms of all measurable development indicators. The region is home to approximately 23% of the world population, yet, in 2005, over one-third of the world's poor and undernourished persons lived in this region, (estimate based on the internationally comparable poverty line of 'one dollar a day in 1985

purchasing power' and a calorie consumption line of 2100 kcal/person/day)¹. Although, there are many commonalities among the countries of the region, considerable differences exist among them in terms of agricultural and economic development and other human development indices^{1,7,8}. These differences arise due to (among other variables) differences in the food security and food supply situations in these countries.

Food supply and nutritional status

Every year, the FAO prepares Food Balance Sheets of countries from where data on food production, import (commercial, food aid), export, feed and seed and other net uses (industrial and other) are available. The net supply of food available for human consumption is calculated from (production + import) – (export + feed and seed + other net uses). Data thus obtained for food for human consumption concur fairly well with actual intake data obtained from household food consumption surveys and therefore serve as a dependable proxy indicator of food consumption patterns in a given country. Food Balance Sheets provide both quantity (total and per capita per day) and kilo calories (kcal) (total and per capita per day)⁹. In this paper, all data are shown as kcal/capita/day for each food item.

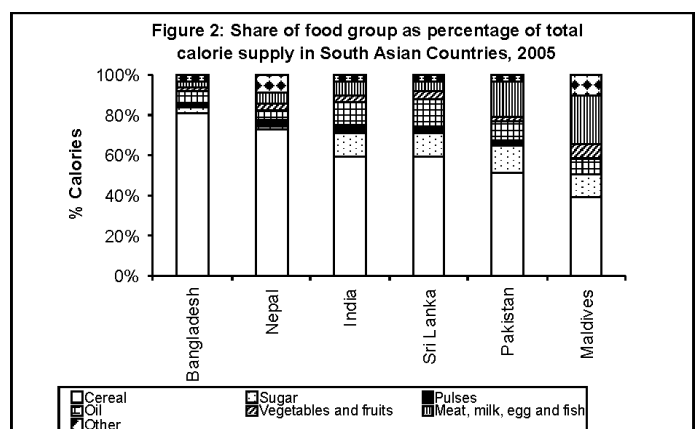
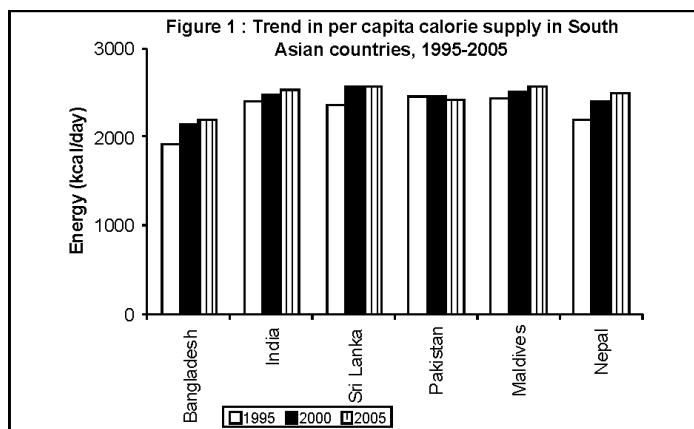
Information on per capita energy availability calculated by FAO provides a picture of the patterns of food consumption and food security in some of the countries of Asia¹⁰. Using 2002-2004 data, Table 1 gives the dietary energy supply in countries in South Asia. The Maldives had the highest national per capita dietary energy supply (2600 kcal/day), while Bangladesh had the lowest (2200 kcal/day).

Overall, the average dietary energy supply in South Asia is 2424 kcal/capita/day. Analysis of the trends in dietary energy over ten years between 1995-2005¹¹ shows that the per capita energy supply in all countries except Pakistan has increased during this period, with Bangladesh and Nepal, the two poorest countries, improving their per

Country	Kcal/capita/day
Bangladesh	2200
Pakistan	2320
Sri Lanka	2390
Nepal	2430
India	2470
Maldives	2600
South Asia	2424

capita calorie supply by about 300 kcal each, Sri Lanka by 200 kcal, India by 130 kcal and the Maldives by about 100 kcal. The energy supply in Pakistan remained static at the level of just over 2400 kcal/capita/day during this period (Figure 1).

The data on the contributions of the various food groups as percentages of the total dietary energy supply is an indicator of energy diversification in South Asian countries (Figure 2). Bangladesh has the highest dietary energy supply from cereals (DES Cer %, an indicator of poverty), amounting to 80%, followed by Nepal, 72%. The lowest DES Cer % is in the Maldives (39%). A high intake of sugar, which is a characteristic feature of the changing dietary trends in Asia, is noted to be approximately 12% in India, Sri Lanka, Pakistan and the Maldives, compared to only 3% in Bangladesh and less than 2% in Nepal. Sri Lanka has the highest consumption of edible oils (12.9% of total energy, mostly as coconut oil), followed by India (10.8%, all types of oils) and Pakistan (9.7%, mostly palm oil). People of the Maldives and Pakistan consume the highest percentages of foods of animal origin (23.6% and 17.7% of the total energy, respectively) in the region, as compared to the minimal contribution made by foods of animal origin to diets in Bangladesh (3.1%). Diets in the Maldives have relatively higher percentages of fruits and vegetables (7.3% of the total calories), as compared to only 2.6% in Pakistan and less than 2% in Bangladesh. This reflects the poor diversification of the diets in Bangladesh and Nepal. The diets in other countries are relatively more diversified.



Country	Undernutrition (Total population)	Stunting (U5 population)	Underweight (U5 population)
Bangladesh	30	43	48
India	20	46	47
Sri Lanka	22	14	29
Pakistan	24	37	38
Nepal	17	51	48
Maldives	10	25	30

Country	Population density (per sq. km) ²	Per capital GNI (US\$) ⁸	Life expectancy at birth 9years) 2005-2010		Infant mortality rate (per 1000 live births) ¹
			Male	Female	
Bangladesh	1045	480	63.2	65	54
India	336	820	63.2	66.4	56
Maldives	1104	2680	67.6	69.5	33
Nepal	184	290	63.2	64.2	56
Pakistan	198	770	65.2	65.8	79
Sri Lanka	316	1300	68.8	76.2	12
Bhutan	46	1410	64	67.5	65

There are notable differences among the South Asian countries in the types of cereals and other food products consumed. For example, rice is by far the most predominantly consumed cereal in Bangladesh whereas wheat is predominant in Pakistan. The other countries consume both rice and wheat, with more of rice than wheat. As for foods of animal origin, Pakistan has the highest consumption of milk in the region, while the Maldives consumes most of its animal foods in the form of fish. Beef is the largest component of the meat consumed in Pakistan and Nepal, whereas in Sri Lanka and the Maldives more chicken is consumed as compared to other meat products. In respect of fish, Bangladesh and Nepal consume mostly fresh water fish, while in Sri Lanka and the Maldives marine fish are predominantly consumed.

The quantity and quality of diets in a country are a clear reflection of the nutritional status of its population. Table 2 shows the prevalence of undernutrition in the total population and stunting and underweight among under-five-year-old children in South Asian countries.

The prevalence of under-nutrition in the total population is highest in Bangladesh (30%) and lowest in the Maldives (10%); other countries have undernutrition figures ranging from 17% to 24%. Bangladesh, India, Nepal and Pakistan experience high prevalence of under-five stunting (43-51%) and the incidence of underweight (47-48%). Sri Lanka has the lowest incidence of child stunting rate (about one-third that in Bangladesh, India and Nepal, and one-half that in the Maldives). Sri Lanka and

Maldives have similar rates of prevalence of underweight in children.

One-way ANOVA test of the data from the South Asian countries shows that total per capita energy supply is significantly ($r^2 = 0.937, p = 0.001$) negatively associated with the percentage of undernutrition in the total population (Figure 3). There is also a positive, although insignificant ($r^2 = 0.511, p = 0.110$), association between national income and total per capita energy supply (data not shown). Thus, national income largely, but not wholly, determines the pattern of food consumption and nutrition in a country¹¹.

Development indicators

Table 3 shows some of the development indicators for South Asian countries, having a bearing on the food security and nutrition situation. In South Asia, the most populous countries in terms of density of population are Bangladesh (1045 persons/sq. km) and the Maldives (1104 persons/sq. km). Bhutan has the lowest population density (46 persons/sq. km). The Maldives is richest country in the region, with per capita Gross National Income (GNI) of US\$2680, followed by Bhutan (US\$1410) and Sri Lanka (US\$1300). Nepal has the lowest GNI (US\$290), with Bangladesh coming in at one rank above (US\$480) (Table 1).

Sri Lanka and the Maldives have the lowest Infant Mortality Rates (IMRs) (12 and 33, respectively per 1000 live births) and the highest life expectancy at birth (68-69 years for men, 70-76 years for women) in the region. These two countries also have the highest Human

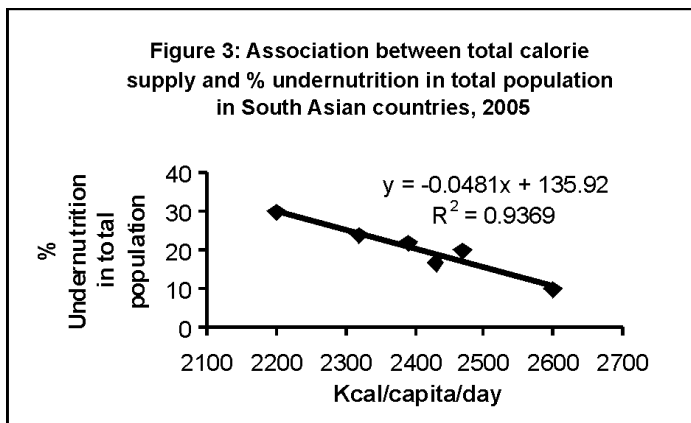
Development Index (HDI) scores, 0.743 and 0.741, respectively. Bangladesh and Nepal have the lowest HDI scores. The data also show that the Maldives, although having a GNI twice that of Sri Lanka, has three times the incidence of IMR. Thus, health indicators such as IMR are not always in close correspondence with national income.

Information systems for assessing food insecurity and vulnerability

The FAO's Food Insecurity and Vulnerability Information and Mapping Systems (FIVIMS) framework provides a range of activities that can be carried out, both at the national and international level, in support of improved information so as to achieve the goals of food and nutrition security. At the national level, it is implemented through the linking of information systems that gather and analyze data relevant for measuring and monitoring food insecurity and vulnerability¹².

Categories of existing national information systems and indicators

Most countries have established statistical services and systems that generate and analyze information. Some categories of existing national information systems include those dealing with agriculture, health, land, water and climate, early warning systems, household food security and nutrition information systems, market information systems and vulnerability assessment and mapping systems¹³. Examples of a set of key food and nutrition indicators that are relevant to food security and nutrition are given in the box below.



- Box : Food and nutrient intake indicators**
- Average energy intake
 - Average food intake of major groups
 - Daily per caput protein intake
 - Percentage of energy from protein
 - Daily per caput carbohydrate intake
 - Percentage of energy from carbohydrate
 - Daily per caput fat intake
 - Percentage of energy from fat
 - Percentage of protein from animal source
 - Dietary energy supply
 - Percentage of undernourished population

At the national level, stronger and more integrated food insecurity and vulnerability information systems will provide better and more up-to-date information to the policy makers and members of civil society concerned with food security issues at all levels in the country, and will facilitate the assessment of policy and programme options for improving the nutrition situation. The focus of most information collection and analysis is by sectoral or sub-sectoral units. Technical constraints arise from lack of trained human resources to manage complex information systems and conduct the multi-sectoral analyses that are required for tackling food security issues. The best method of measuring household food security is another issue of much debate, partly because of the cross-linking areas of food security and nutrition issues¹⁴. For example, in terms of data use, it is recommended that, in food consumption surveys, the weighed food method or the 24-hour dietary recall method should preferably be used. In the case of non-availability of such information, data derived from surveys through food frequency questionnaires would have to be used. It is also very important that only representative, nation-wide surveys with special emphasis on the most recent information available be used.

Food consumption, utilization and nutritional status: example from Orissa

Studies of food security and vulnerability were undertaken in selected states of India as part of an FAO-supported FIVIMS India pilot project launched in 2003 by the Ministry of Food and Consumer Affairs together with the state-level departments of Food and Public Distribution¹⁵. The study, which covered four districts in Orissa and also the State of Himachal Pradesh, assisted in the development of a framework for establishing an information system to monitor food insecurity and vulnerability in Orissa. A vulnerability group profiling (VGP) approach was used to estimate the number of vulnerable persons, identify them and their geographical locations, and determine the reason for their vulnerability. The VGP can be used to analyze the multiple factors influencing food insecurity in relatively homogeneous groups: their assets, external factors that affect lives in the community, their own actions resulting in intermediate outcomes, and ultimate food security status. The most important criterion to identify groups sharing common livelihood is source of income (often closely associated with location on the basis of relatively homogeneous

Indicator	Orissa	India
Infant mortality rate (per 1000 live births)	65	57
% Children 0 to 3 years who are underweight	44	46
% Children 12 to 23 months who are fully vaccinated	52	44
% households using piped drinking water	10.2	42.0
% households with toilet facilities	19.3	44.5

livelihood/agro ecological zones). The VGP is a simple and relatively low-cost tool for building an overview of vulnerability and food insecurity grounded in local knowledge. The basic methodological framework covered five steps: review of existing data, identifying main vulnerable livelihoods, community level qualitative research, household level quantitative research, and validation. This tool helps to uncover the relative degree of vulnerability of different sub-groups and identifies the key characteristics of each. These include asset base (e.g. land access), geographical characteristics of physical assets, possible livelihood strategies, diet, and nutritional status. An overview of key indicators for undernutrition and health in Orissa is provided in Table 4¹⁶.

Food and nutrition indicators: example from Bangladesh

Analysis of data from the FIVIMS initiative in Bangladesh revealed a rich information system accessed and used by various organizations-government, non-government and academic-for purposes determined by their own mandates¹⁷. Inter-sectoral analyses of child malnutrition data was carried out using data collected by three organizations (Bangladesh Bureau of Statistics, Ministry of Finance and Planning which conducts the Child Nutrition Survey of Bangladesh; National Institute of Population Research and Training of the Ministry of Health and Family Welfare which conducts the Bangladesh Demographic and Health Survey (BDHS), and Helen Keller International, an international organization which conducts a bimonthly Nutritional Surveillance Programme (NSP). These data show a persistent decreasing trend in child stunting and underweight during the 1990s (from 60-70% in 1990 to 48-50% in 2000). The NSP, however, shows a slightly higher prevalence (5-10%) of malnutrition.

Data sets on maternal malnutrition from both BDHS and NSP show a high prevalence of chronic energy deficiency among women of childbearing age (40-55%) indicated by a body mass index (BMI) of less than 18.5 kg/m². Data from these sources also show a decrease in maternal malnutrition during the period 1992 -2000. The latest national data

show the prevalence of low birth weight to be 36%¹⁸, that of anaemia in children under the age of five years to be 60%¹⁹, and iodine deficiency disorders (IDD) among school age children to be 34%²⁰. IDD surveys are regularly being conducted every five years in Bangladesh.

Seasonality and disaster-related indicators

Selected smaller-scale surveys pertaining to a vulnerable area or a population group facing recurrent adverse conditions, seasonality, or food shortages as a result of natural calamities or man-made disasters may also have to be included. At-risk population groups, trends, and seasonal variations should be kept in mind when presenting food consumption data. In particular, if there is prior information to suggest that problems of malnutrition and food insecurity are concentrated in certain regions or among certain social groups, then it would be necessary to concentrate on those specific regional groups. There would be a need to disaggregate food consumption data as much as possible. Average food intake derived from food consumption data should provide kg/person/year by major food groups, kcal/person/day including total energy, percentage of energy from protein and fat and, if available, also the percentage of energy by major food groups, protein and fat intakes in g/person/day including the total intakes and the percentages of energy from animal and vegetable sources; the intake of micronutrients should also be included, if the data are reliable and appropriate. Typically, for micronutrients for which there is likely to be a high day-to-day variability in intake, food frequency questionnaires would need to be combined with multiple recalls on sub-sample populations.

Community based assessment

Dietary modification and diversification indicators can be used to assess nutrition improvement in community-based programmes (Table 5). This approach can be used to enhance our understanding of micronutrient deficiency in the community, and help to empower the community to be more self-reliant in addressing its nutritional problems²¹.

Table 5: Inputs and outcomes for prevention and control of micronutrient malnutrition through community-based programmes

Input	Output	Outcome
Dietary improvement: Food production for consumption; Information, Education and Communication (IEC); Food Based Dietary Guidelines (FBDGs); complementary food production	<ul style="list-style-type: none"> ➤ Number of home gardens; number of chicken and duck raising activities; number of community fish ponds ➤ Consumption of micronutrient rich foods (bioavailable) food combinations ➤ Dietary intake of enhancers of absorption ➤ Avoidance of inhibitors 	<ul style="list-style-type: none"> ↑ Knowledge, Attitude and Practice (KAP) towards usage of micronutrient rich foods; ↓ micronutrient deficiency prevalence; gradual elimination of major micronutrient deficiencies (IDA and VAD)
Food fortification: Iodized and double fortified salt; other foods Basic health services & community participation: Antenatal Care (ANC), immunization, parasite control, hygiene and related activities/services	<ul style="list-style-type: none"> ➤ % household usage of iodized/double fortified salt; % individual and household use ➤ Frequency of contacts with pregnant women (minimum 4 Antenatal Care contacts); % coverage of target groups 	<ul style="list-style-type: none"> ↑ KAP towards usage of micronutrient rich foods; ↓ IDA and IDD prevalence → elimination of IDA and IDD; Improved pregnancy outcomes (increased birth weights); ↓ IDA prevalence; ↓ worm infestation rates
Agricultural extension services:	<ul style="list-style-type: none"> ➤ Mobilizing small farmers, households, women's groups towards food production activities; ➤ Number of poultry vaccinations carried out 	<ul style="list-style-type: none"> ↑ KAP towards usage of micronutrient rich foods; increase in household income; ↓ prevalence of micronutrient deficiency → gradual elimination

Policy considerations

An important first step is the identification of food-insecure and vulnerable groups, the prevalence and extent of low food intake and undernutrition among these groups, and the reasons for their food insecurity and vulnerability. Such information makes it possible to monitor and assess the situation, and to design and evaluate possible policies and interventions. This is also essential for designing and directing interventions that actually reach the undernourished and vulnerable people efficiently.

Such operational activities can also provide a wide range of community-based food security and nutrition-related indicators that can be periodically re-evaluated so as to strengthen community awareness, promote food security and assess nutritional needs at various levels. The purpose of national and community information systems is to facilitate the access by various user groups to more comprehensive information that is up-to-date and easy to interpret, so as to enhance food security policy formulation and improve the design and focus of interventions. The different sectors need to be linked in such community-based programmes in order to build a truly multisectoral

approach. The development of policies that are strongly supportive of community-based programme implementation can greatly empower communities and improve the existing levels of food security.

Conclusion

The ultimate goal of nutrition improvement programmes is to impact the target communities, and improve the lives and nutritional status of the population. Systematic management information systems at different levels, with data presented in different forms for different purposes and objectives, need to be established. Fundamental to the sustainability of programmes in a community is the ability of its members to make enlightened decisions and then be able to implement them. Many of the actions needed for achieving the objectives laid out by nutrition improvement programmes involve relatively little additional cost to governments. They entail assigning higher priority to integrated nutrition training, devolving responsibility to the district, sub-district and community levels, carrying out the process of social mobilization for empowering the extension workers and volunteers, individuals and communities, to take action, and fostering greater inter-

sectoral collaboration. What is needed is the political will to instill in the community a strong sense of ownership and strengthen capacity building along with appropriate tools to implement policies for improvement of the nutritional status of the population.

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